

Patent  
Attorney's Docket No. 1010315-000092

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of

Kent Malmgren et al.

Application No.: 09/651,130

Filed: August 3, 2000

For: Absorbent Foam Material, a Method  
of Producing It and an Absorbent  
Structure Containing Said Foam  
Material



Group Art Unit: 1771

Examiner: Victor S. Chang

Confirmation No.: 1064

**DECLARATION OF KENT MALMGREN**

Commissioner for Patents  
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Sir:

I, Kent Malmgren, hereby state as follows:

1. I am one of the inventors of the subject matter disclosed and claimed in the above-referenced patent application. My education is Master of Science in Chemical Engineering from the Royal Institute of Technology, Stockholm, Sweden, and I am employed by SCA since 1986. I have mainly been active in research work and my position is research leader in the fiber chemistry area.

2. I have reviewed and am familiar with U.S. Patent No. 6,261,679 of Chen et al. issued July 17, 2001, to Kimberly-Clark Worldwide, Inc. ("Chen").

3. In and around January to March 2006 I conducted experiments to prepare and test materials according to Example 3 of Chen.

**Sample Preparation**

4. In order to replicate the absorbent material of Example 3 of Chen, carboxymethyl cellulose ("CMC") with the trade name Blanose 74HC, produced by Hercules Inc., was used in these experiments. This CMC grade has an average molecular weight greater than 1000000 and should, according

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to the supplier, be equal to the grade named CMC-TH, which was used in Example 3 in Chen. Eucalyptus fibers were obtained from the Votorantim, Celulose e Papel Company, Brazil and these fibers showed a Canadian Standard Freeness of 570 ml. The pulp was disintegrated according to standard procedures, SCAN method No. C18:65, and then dewatered on a büchner funnel.

5. The consistency of the dewatered pulp was measured and an amount corresponding to 20 grams dry pulp was added to a solution of CMC in distilled water. The mixture, which contained 1.25 g CMC, 20 g eucalyptus fibers and 1000 g distilled water, was then agitated in a Hobart mixer for 2 h at 23°C. The agitated mixture was transferred to a pan and cooled down to about 20°C in a Tefcold freezer, type TFF370. The amount of mixture/ pan area was the same as in Chen, i.e. about 0.78 g/cm<sup>2</sup>. The frozen material was then transferred to an Edwards Modulyo freeze dryer. After freeze-drying, the dry sheet was inspected and it appeared to have low density and high porosity.

6. The freeze-dried material was heat treated at 130°C in a Heraeus oven, type T6120, for 2 h. As in Example 3 of Chen, one section of the material was then further treated at 180°C for 10 minutes. Another section was sprayed on both sides with a Kymene 217 LX solution having 1.1 % solids. Kymene 217 LX is a polyaminoamide-epichlorohydrine resin produced by Hercules Inc. and should, according to the supplier, be equal to Kymene 557-LX, which was used in Chen. The sample had a dry weight of 6.1 g and was sprayed with 30 g of the Kymene solution (15 g on each side). The sprayed sample was then dried and heat-treated in an oven at 105°C for 25 min.

#### Prepared samples

7. Three absorbent materials according to Example 3 of Chen where prepared:

- A. Treated at 130°C for 2 h
- B. Treated at 130°C for 2h and 180°C for 10 min.
- C. Treated at 130°C for 2h and sprayed with Kymene solution.

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Measuring methods

8. The prepared samples were examined with two methods described in Chen, Absorption under load (AUL) and Free Swell Capacity. As prescribed in Chen, the test liquid was 0.9 % saline solution.

9. The samples were also tested with the methods used in the present patent application: Absorption rate, Liquid distribution capacity, Storage capacity and Pore volume distribution.

10. Absorption rate was measured as described on page 6, line 15, to page 7, line 23, of the present application.

11. Liquid distribution capacity was measured as described on page 7, line 24, to page 8, line 17, of the present application.

12. Storage capacity was measured as described on page 8, lines 19-27, of the present application.

13. Pore volume distribution was measured as described on page 14, lines 19-26, of the present application.

14. In the tests according to the present application, synthetic urine was used. The synthetic urine was made according to the recipe of 0.66 g/l MgSO<sub>4</sub>, 4.47 KCl, 7.6 g/l NaCl, 18.00 g/l NH<sub>2</sub>CONH<sub>2</sub> (urea), 3.54 g/l KH<sub>2</sub>PO<sub>4</sub>, 0.754 g/l Na<sub>2</sub>HPO<sub>4</sub>, 1 ml/l of a 0.1% solution of Triton X-100, which is a surfactant sold by Aldrich. The substances were dissolved in deionized water.

Results

15. Results of the sample materials prepared according to Example 3 of Chen measured according to the two methods described in Chen are as follows:

Sample	Absorption under load (g/g)	Free Swell Capacity (UNITS)
A	11.7	22.5
B	13.8	23.9
C	13.9	18.7

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16. Results of the sample materials prepared according to Example 3 of Chen measured according to the methods used in the present patent application are as follows:

Sample	Absorption rate (ml/s)	Liquid distribution capacity (g/g)	Storage capacity (%)	Pore volume distribution (g/g)
A	0.49	8.3	12	2.2
B	0.3	10.8	5	1.6
C	0.2	7.1	3	1.7

17. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 81 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name: Kent Malmgren  
Kent Malmgren

Date: 2006-04-07

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